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| **Doc No.** EIC-ESH-PLN-002 | **Author:** C. Schaefer; W. Rainey | **Effective Date:** August 14, 2024 | **Review Frequency:** 5 years |
| **Plan:** Memorandum of Agreement for Non-NRTL Electrical Equipment Transfer | | | **Revision:** 00 |

# Memorandum of Agreement

between

# Brookhaven National Lab (BNL)

and

# Thomas Jefferson National Accelerator Facility (JLab)

# Non-NRTL Electrical Equipment Transfer

## August 14, 2024

## Prepared by:

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Date: 8/14/2024

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Date: 8/14/2024

William Rainey, EIC ESH Manager, TJNAF

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Luisella Lari, EIC Project Manager, BNL

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Date: 8/14/2024

Katherine Wilson signing as the delegate of James Fast, EIC Associate Project Manager, TJNAF

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Signed by:
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## REVISION HISTORY

| Revision | Effective Date | Summary of Change |
|---|---|---|
| 00 | 8/14/2024 | Initial Version |

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# Memorandum of Agreement

## A. Purpose

Thomas Jefferson National Accelerator Facility (JLAB) and Brookhaven National Laboratory (BNL) are committed to the successful completion of the Electron-Ion Collider (EIC) project at BNL. This Memorandum of Agreement (MOA) will define the process for transferring Non-NRTL electrical equipment designed and/or fabricated on behalf of or at JLAB to BNL for use in the EIC.

## B. References

1. Jefferson Lab Environment, Safety, and Health (ESH) Manual Supplement, Construction and Modification Requirements for Custom and Non-NRTL Electric Equipment
2. National Fire Protection Association (NFPA) 70E – 2021, Standard for Electrical Safety in the Workplace
3. NFPA 70 – 2023. National Electrical Code
4. Brookhaven National Laboratory, Standards-Based Management System, Electrical Safety Subject Area, Section 2 - Acquiring Electrical Equipment and Components
5. Brookhaven National Laboratory, Standards-Based Management System, Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance Subject Area

## C. Objectives

1. Define minimum construction requirements for Jefferson Lab built electrical equipment.
2. Describe the documentation requirements for Jefferson Lab built electrical equipment.
3. Identify responsibilities for performing field evaluations.
4. Identify the responsibilities of Jefferson Lab for equipment construction.
5. Identify the responsibility of Jefferson Lab's Electrical Authority Having Jurisdiction (EAHJ).
6. Identify responsibilities of Brookhaven National Lab's EAHJ.
7. Identify responsibilities of Brookhaven National Lab's EIC project.
8. Define the process for electrical equipment approval by Brookhaven's EAHJ.

## D. Roles and Responsibilities

1. Jefferson Lab
    a) JLAB's EIC project office is responsible for the execution of this MOA.
    b) Construct electrical equipment in accordance with reference (1), (2), and (3).
    c) Prepare the required documentation for each piece of equipment.
    d) Provide the following information to allow BNL to generate Lockout/Tagout (LOTO) procedures, as applicable. All sections are derived from reference (2), article 120.4(B)(1) through 120.4(B)(14) and reference (5).
        i) Startup and shutdown process/procedures
        ii) Identify all types and magnitude of input and output hazardous energy (e.g., electrical, steam, moving parts, hydraulic, etc.)

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iii) If applicable, identify any disconnection location and disconnection position for de-energization (i.e., valve name/number, breaker name/number, switch name/number, etc.)

iv) If applicable, identify specific location (i.e., drain valve #, motor starter, switchgear, etc.) and method of performing the zero-energy verification?

(1) Testing

(a) To include how to establish an electrically safe work condition in accordance with reference (2) article 120.5(7) and 120.5(8)

v) If applicable, identify all types and magnitude of stored, induced, or residual hazardous energy (e.g., capacitors, batteries, pressurized piping, thermally hot or cold piping, rotating parts, etc.) and methods of relieving the stored energy

vi) If applicable, identify how to control sources of stored, induced, or residual hazardous energy (e.g., piping drained and blanked off, feeder disconnected, system opened to avoid re pressurization, capacitors shunted, moving parts blocked or secured, etc.)

2. Brookhaven National Lab
   a) BNL's EIC project office is responsible for the execution of this MOA.
   b) BNL's EAHJ to review and if acceptable, approve JLAB's constructed equipment in accordance with reference (2), (3) and (4).
   c) The EIC project provides the necessary LOTO procedures, as applicable to meet the requirements in reference (5).
   d) Ensure field evaluation of JLAB constructed equipment as required by reference (2), (3) and (4) is performed.

## E. Work Process and Approval

1. JLAB will design and construct equipment for the EIC as identified by the EIC project management team. JLAB will prepare and review the new work request and required documentation. JLAB EAHJ will ensure an inspection of the equipment is performed to ensure it complies with the construction standard.
2. The Brookhaven National Lab member of the design team will arrange the Brookhaven National Lab electrical safety review during the design phase.
3. The Brookhaven electrical safety team will review and accept/approve drawings, procedures, and equipment before initial startup. Additionally, Brookhaven's EIC project will prepare their required portions of the LOTO procedures prior to startup.
4. Communicating early and often between Jefferson Lab and Brookhaven will be crucial to the success of this project.

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## F. Required Documentation

Following the design review and approval from the relevant EIC project manager(s), the new work request will be submitted to the Non-NRTL application to register the design and begin the process of collecting documentation for the equipment construction as follows:

1. Drawings
2. Bill of materials
3. LOTO procedure information as defined in roles and responsibilities

## G. Dispute Resolution

Unresolved disagreements between Jefferson Lab EAHJ and Brookhaven EAHJ shall be raised to the ESH division director of each facility. The ESH directors will enter into a discussion to resolve the issue(s).

## H. Modifications

Modifications within the scope of this MOA will be made by mutual consent of the parties and by issuance of a written modification, signed and dated by all parties, prior to any changes being made.

## I. Points of Contact

The principal points of contact for this instrument are:

**BNL Electron-Ion Collider**
Charles Schaefer
BNL EIC ESH Manager
Phone: 631) 344-4728
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**JLAB Electron-Ion Collider**
William Rainey
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## J. Term

This instrument is executed as of the date of the last signature and is effective through the end of the EIC project, at which time it will expire unless modified.